

BELLCOMM, INC.

SUBJECT: Highlights of Crew Safety Related
Conferences Held at MSC on
October 19-20 - Case 320

DATE: October 26, 1967

FROM: J. A. Llewellyn

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(NASA-CR-90263) HIGHLIGHTS OF CREW SAFETY
RELATED CONFERENCES HELD AT MSC ON OCTOBER
19-20, 1967 (Bellcomm, Inc.) 2 p

MEMORANDUM FOR FILE

So as to follow-up on certain crew safety "concern areas," the writer visited the following MSC personnel on October 19 and October 20:

Armistead Dennett	- Systems Engineering
Lyle Jenkins	- Systems Engineering
Warren North	- Flight Crew Support
Charles Teixeira	- Flight Performance & Dynamics
Dickie Warren	- Flight Crew Support
Michael Wash	- Flight Crew Support.

Below is a summary of conference results:

1. The spacecraft structural failure with S-IC single engine-out problem has a criticality of roughly 300 now (it had been 3200). An analysis to better define the loads problem will be accomplished by NAR* after Boeing/Huntsville completes an update of the space vehicle dynamics analysis. MSC is awaiting NAR's proposal on SC structural tests, which may be conducted later to better define structural limits.
2. MSFC has been using in their EDS analyses an abort warning time (time from abort signal to LV structural limit or LEV alpha limit) of 1 second. This appears short considering MSC studies which conclude that 2-3 seconds of warning time are required from abort signal to LV explosion in order to prevent SC failure. An extensive reevaluation of warning time as a function of altitude is under way. Inputs are required from a number of test programs, explosion/yield analyses by the University of Florida, MSFC LV trajectory studies, and structural analyses by MSC, before a final run can be made using the MSC program. It appears that this fairly complicated task needs an overall task leader if a timely solution is to be achieved.

Opinions are that warning time requirements might be increased by as much as 0.5 sec, due to increased SC weight (11,000 lbs to 13,000 lbs). Modifications in the explosion/yield model, however, could change the time in either direction. If the warning time requirements change, EDS analyses will have to be updated. For many malfunctions, warning times in excess of 1 sec. are difficult to achieve.

*North American-Rockwell Corp. (formerly North American Aviation Inc.)

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3. The writer "flew" a number of flights in the DCPS (Dynamic Crew Procedures Simulator). While performing aborts during the high Q flight regime, it was noticed that a tumbling maneuver was present in pitch throughout the period with the tower attached. This was explained as an instability which is being noticed for the first time by use of this particular CM/LET dynamic simulation. It may or may not be a real problem; however, it is being evaluated by NAR and NASA personnel.
4. NAR has indicated that the addition of readout capability to provide full Q-ball redundancy will be very expensive and rough on delivery schedules. They reported that the change could not be incorporated earlier than AS-513 without a schedule slip. The Change Board will consider the change during its October 27 meeting.
5. Discussions involving the imminence of SM breakup after a high Q abort indicated that breakup would be rather rapid; however, it is not clear whether or not it could precede LV post-abort breakup. Requests were made for additional coordination concerning this phenomenon.
6. Discussions were conducted which dealt with the effectiveness of the Crew Safety Panel, of which the writer is a member. This included thoroughness of subject coverage and diligence of Panel follow-up.


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2031-JAL-mch

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